Discussion on "RIA Project: Spoke-cavity Design" by Ken Shepard

Part of the presentation focused on the comparison of elliptical and spoke resonators at different temperatures. The interpretation of some curves depended on the validity of the use of 10 nΩ as residual surface resistance. It was pointed out that this value is too high for elliptical cavities. Shepard showed that using a lower value for the comparison made the advantage for spokes only more obvious. Experimental data at LANL show that well cleaned spoke resonators can reach residual resistance as low as 8.5 nΩ.

In support for the validity of the comparison it was also pointed out that the comparison of 700 MHz elliptical cavities and 350 MHz spokes reflects their use in an accelerator. Also, this way cavities of similar dimensions are compared.

The design work presented also showed a comparison of cross-bar to parallel bar spoke cavities. Delayen pointed out that the result of comparable peak fields and shunt impedance is only valid for higher β spokes. For lower β spokes the cross-bar has been shown to be superior. Shepard explained that his major reason to disregard the parallel bar spokes is their poor mode splitting.

The stiffness of multigap spoke resonators brings up the question of their tunability. Shepard laid out the plan to measure frequencies before the final weld of the endcaps. Another step done before this weld and the tuning is an electropolish of the cavity parts. Delayen pointed out that the tuning will not be affecting the field flatness very much. The strong magnetic coupling of the cells will prevent this. Tuning will mostly affect the frequency. Final tuning after welding is mostly to compensate the effect of the polishing.